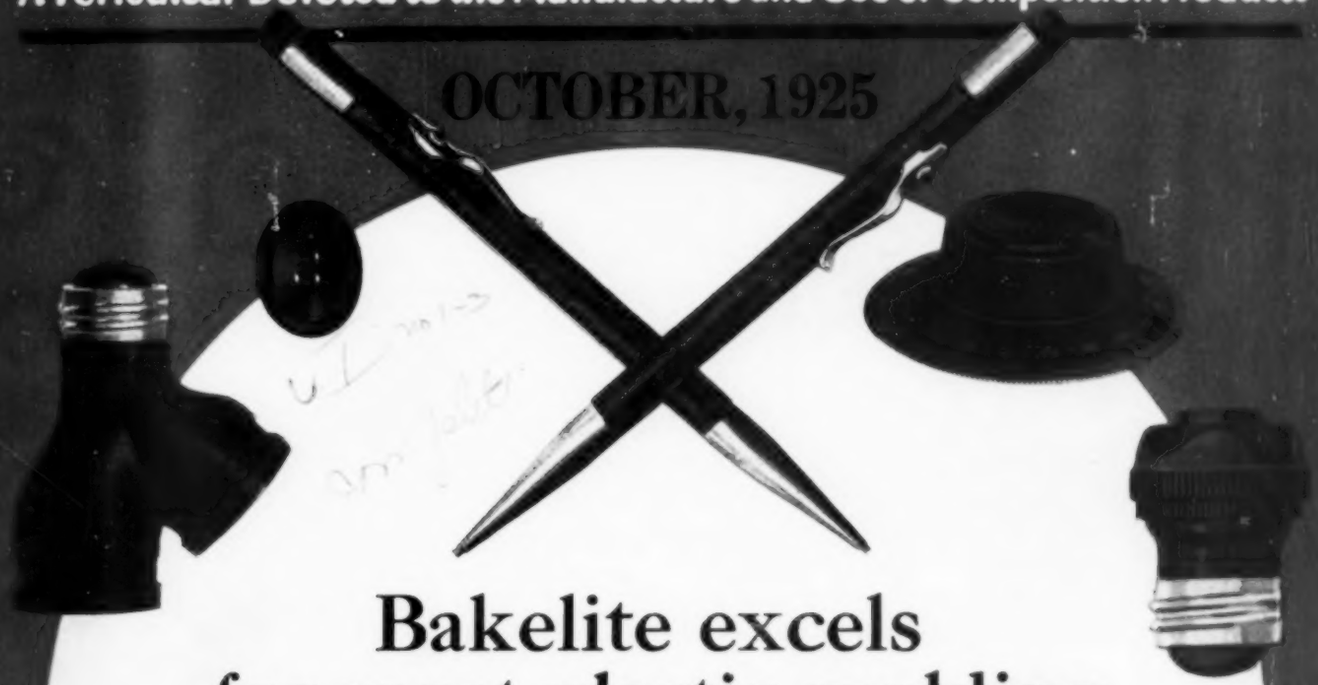
PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

OCTOBER, 1925



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THE ECONOMY MATERIAL OF COUNTLESS USES

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Complete Equipments for Production Moulding Our Specialty

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Hydraulic Equipments for Moulding, preforming, polishing, cake forming, sheeting, extruding, blowing, embossing, dehydrating and hydrostatically pressing, Bakelite Condensite Redmanol, Celluloid, Fiberloid, Pyralin, Viscoloid, etc., or compounds of Shellac, Rubber, Casein, Bituminite, Gelatine, etc., known under various trade names.

Hydraulic—Rod Presses, Rodless Presses, Semi-Automatic Presses, Tilting Head Presses, Angle Presses, Guns, Sheeting Machines, Pumps, Accumulators, Valves, Packing, etc.

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Specialties—Steam Plates, Cast Iron; Steam Plates, Machine Steel; Gas Plates, Electric Plates, Swing Joints, Blanking Rolls, Ball Turning Lathes, Ball Grinding Machines, Edging Machines, Paper Cutters, Blowing Presses, Hobs, Dies, Die Engraving, Tool Making, Special Machinery, Designing, etc.

EXPERIENCE AND FACILITIES

Our experience as designers and builders of the most efficient machinery and moulds for hard and soft moulded plastics is based on fifty years' experience and study of moulding problems in pyroxylin, rubber, shellac, phenolic resins, bituminous and casein compounds.

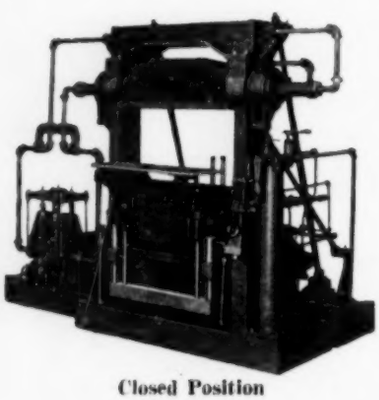
Our moulding units and specialized moulding machinery are designed and built under supervision of expert engineers experienced in thermoplastics.

Why not avail yourself of our experience and facilities rather than resort to individual makers of fractional parts of the equipment you need when we can supply them all?

EXPERIMENTAL DEPARTMENT

We have permanent equipment available for demonstration.

TILTING HEAD PRESS FOR PRODUCTION MOULDING (Patented)



Closed Position

Embodies the following features:

Direct heated and chilled mould.

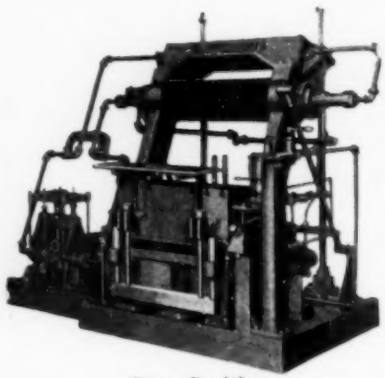
Automatic ejection of moulded pieces.

Centralized valve control.

Hydraulically operated steam and water distributing valve.

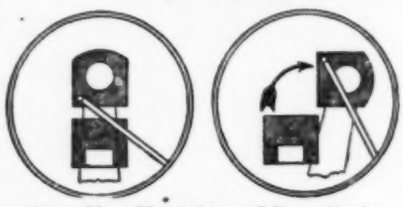
Head Tilts giving unobstructed view and access to upper and lower dies.

Short stroke due to Tilting feature low water consumption.

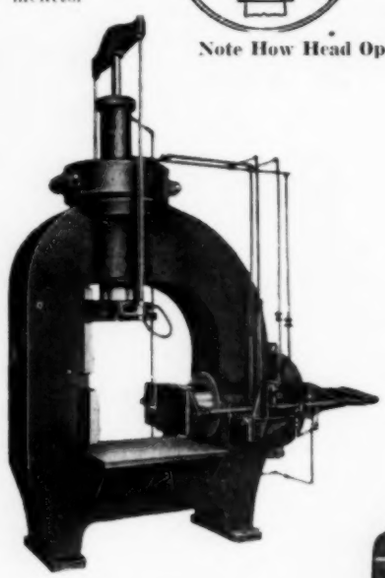


Open Position

We build this type of press in three standard sizes. Can build to suit your requirementts.



Note How Head Opens Like a Book



ANGLE MOULDING PRESS

(Patented)

Rodless Type for Production moulding with direct heated and chilled moulds for moulding pieces requiring split dies.

RODLESS HYDRAULIC PRESS FOR HAND MOULDS

Simple, compact, rigid construction, no rods to stretch or nuts to work loose, insures parallel surfaces between platens. Built in any size or power.

PLASTICS is born to help every fabricator and user of composition products. It will fill the want which the plastics industry has long felt—for a medium that will disseminate news and valuable information and will sponsor the best interests of the industry.

Each month it will contain new and valuable ideas on the manufacture and fabrication of Pyroxylin, Bakelite, casein, shellac, and the allied plastics. It will give the source, history, and current developments of usable materials.

It will contain articles on the installation and use of new equipment designed especially for service in the composition products field. It will also have many pages devoted to trade news. Patent facts, abstracts, and translations, will form interesting departments.

The plastics industry will be thoroughly combed for informative data by a capable editorial staff experienced in the field. The industry's leading executives will furnish valuable articles based on their varied activities.

For the benefit of its readers Plastics will always attempt to coordinate ideas with achievement. It is dedicated to unqualified service and to that spirit of advancement upon which the industry is inevitably entering.

We hope you will enjoy reading PLASTICS as much as we enjoyed creating it for you. Naturally, a publication to be of the most benefit to its industry must have the support of the important men in it.

These are the things we need: Instructive articles, stimulating news, interested subscribers and impressive advertising.

This is your way of making PLASTICS, and through it the industry, a strong industrial force.

We cordially invite criticism and discussion upon all points appearing in PLASTICS.

The Publisher.

PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 1 **October, 1925** **No. 1**

Contents

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PLASTICS

A periodical devoted to the manufacture and use of plastic and composition products

Vol. 1 OCTOBER, 1925 No. 1

The Manufacture of Celluloid

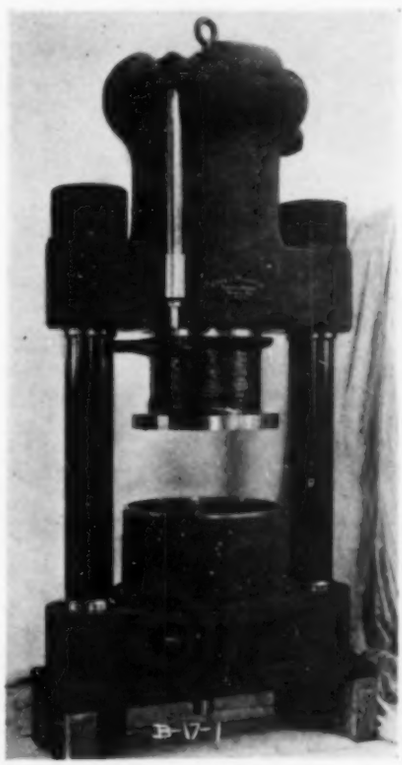
Mechanical advances since the crude but effective methods practiced by Hyatt

By Evarts G. Loomis

Consulting Engineer, Newark, N. J.

HOWEVER much it may be disputed to whom belongs the credit as the original discovery of the nitrocellulose plastic material now generally called celluloid, there is no question that the man who deserves the great honor of having successfully worked out the many most complicated and difficult chemical and mechanical problems involved in its production and useful application to the needs of mankind is John Wesley Hyatt. With his remarkable perseverance, fertility and ingenuity of mind he overcame all the many serious obstacles he encountered, and which had baffled his predecessors, and in a comparatively few years had developed processes and equipment to carry out the successful manufacture of this most valuable of plastic materials and its application to many varied useful arts.

The processes and equipment devised by Hyatt about 50 years ago, though naturally somewhat crude in detail compared with the latest developments, were in principle so efficient that no really basic changes have been made in many of them to this day. For thirty years or more the industry followed his ideas very closely and outside of purely chemical lines very little research or advance was made.



Modern Dehydrating Press

This was apparently a period of growth rather than advancement. It is true many important chemical discoveries in solvents, stabilizers, camphor substitutes, etc., were made and are being made which should be recorded by someone better qualified than the writer to do so, but as to the machinery, the designs made by Hyatt with the able assistance of Charles Burroughs way back in the early days were used with very little change for thirty years and many of these old types are still in use and doing good service in the various plants up to the present day.

Up until 1908 the paper was nitrated in small pots holding small charges of not over six pounds, set on lead covered wooden turn tables and handled by men in the most crude manner, working in an atmosphere red with nitrous oxide fumes. The pots were emptied by manual labor into the acid extractors and the baskets of nitrated cellulose were lifted in the same manner from the acid extractors and dumped into tanks of water and drowned by men with pitchforks.

The nitrocellulose was handled through the wash room into the various wash tanks, beaters, settling tanks and whizzers by men with pitchforks and trucks.

The dehydration was done by pressing the wet pyroxylin in small layers, between blotters or linen pads, or else spreading it on trays and allowing it to dry naturally in racks. These processes entailed a tremendous amount of labor, building space and time compared with the modern alcohol dehydration method.

Crane's Improvements

The pressed cakes of pyroxylin generally mixed with the camphor were disintegrated in a breaker consisting of a drum with radial teeth running at high speed in a casing in which were mounted stationery teeth or blades. This was a most dangerous machine and every once in a while one of these machines would blow up with occasional attendant fatalities. They were the dread of the celluloid plants.

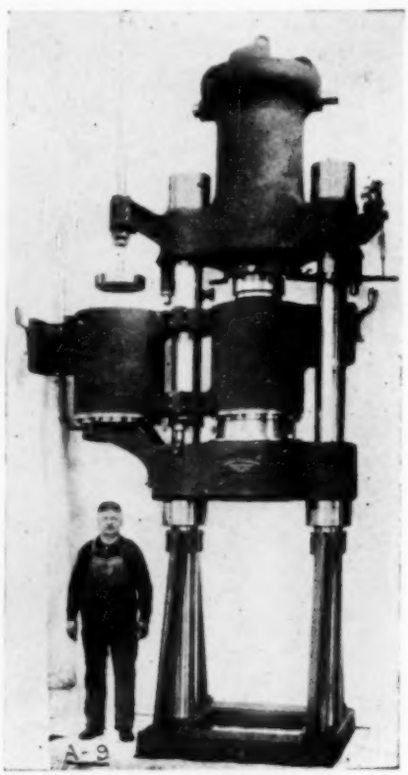
The pyroxylin, camphor and other solvents, colors, etc., were then mixed, colloided and ground entirely on the rolls.

Finally the material was rolled into thick sheets which were laid up and pressed into cakes and then the material sheeted, seasoned and polished or else extruded by hydraulic stuffers to form rods, tubes and beading, much as it is done at the present day.

The person who is largely responsible for instituting research into the celluloid industry with a view to improving the old processes and equipment and who deserves much credit for the great advances he has introduced is Jasper E. Crane of the old Arlington Company, now the DuPont-Viscoloid Co.

When he started in as Chemist at the Arlington plant about the year 1907, he immediately saw the disadvantages and drawbacks of many of the old methods and started experimental work and study to improve them. About a year later the writer was engaged by this Company as mechanical engineer and he had the pleasure and privilege of being closely associated with Mr. Crane and cooperating with him in working out improvements for a period of about nine years.

The worst place in the plant at Arlington at that time was the nitrating house. Here the small hand manipulated pots were soon replaced with large steel pots of three times the size of the old ones taking a charge of eighteen pounds of paper, pivoted on a steel frame table and all the motions except loading operated by compressed air. A new large acid extractor was designed and built which could be loaded, run up to a speed of 1000 revolutions per minute, stopped and emptied on a three minute cycle.



Filtering Press

This equipment after the initial troubles had been overcome, was operated for many years with great success and ran for one period of fourteen months without a fire in the pots or extractors. Also in conjunction with a mechanical drowning apparatus, designed in conjunction with Mr. C. M. Joyce, it produced a nitration which for uniformity and stability we doubt if it has been surpassed on a commercial scale. However, it has now been replaced by the familiar DuPont dipper system of nitration with its many well know advantages, which system is now rapidly displacing all the older pot systems in the various plants.

In the year 1908 an alcohol dehydrating system was perfected using a simple type of hydraulic press to squeeze out the excess alcohol which is added to dilute and carry away the water. This is a very great improvement over the old methods of drying the material in that it gives exact control of the results, is not dependent on weather conditions, eliminates danger from fire and explosion, reduces greatly labor, time of operation, etc. In the first full year's operation it saved the Arlington Company about $50,000.00 in direct costs according to the records kept at that time.

Soon after that time a pumping system was installed to handle all the pyroxylin in its wet state and a blower system to convey the whizzed material from the nitrating to the dehydrating department.

Colloiding

The next step was to introduce bladed mechanical vacuum mixers to compound and colloid the material and recover much of the solvents which were formerly lost on the rolls. This tended towards better control, cleanliness and considerable economy in labor and material.

This was following the German practice and the first machines of this type were of the Werner and Pfleiderer manufacture imported from Germany.

The next most important step was the introduction of the plastic filtering press. Up to this

(Continued on page 25)

Modern European Plastic Materials

A short review of the better known plastic products employed on the continent

By A. Hutin

THE plastic materials found upon the world's markets present a great diversity, and from the pyroxlin products to the more modern snythetic resins there are a large number of other materials. Some of the better know plastic materials that have found a place in modern industry are enumerated below:

Cellulose Acetate Plastics

Name of Product	*Manufacturer or Place of Manufacture.*
Rhodoide	Societe des Usines du Rhone (France)
Sicoid	Societe Industrielle du Celluloid (France)
Plastin	Societe des Matieres Plastiques
Bernite Cervinite	Zelluloidwaren Fabrik at Zollikofen (Switzerland)
Isoloid	Charles Martin at Levallois (France)
Oyocetyle	Societe Oyonnaxienne, Oyonnax (France)
Cellutite	G. Convert & Co. Paris (France)
Satolite	Sato (Chemist) (Japan)
Amzylolithe	Societe Lyonaisse de Celluloide
Novolithe	Societe Bellignite, Bellignat (France)
Aceloide	Petitcollin (Paris, France)
Zellon	A. Eichengruen (and American
Cellone	Cellone Co.) (U. S. and Germany)

Phenol-aldehyde Condensation Products

Magramite	(Manufactured in New Zealand)
Pertinax	(Germany)
Albertol	Chemische Fabrik Dr. Kurt Albert (Germany)
Juvelithe	F. Pollak (Germany and Austria)
Bakelite	U. S. and Germany
Resinite	Lebach (Germany)
Novolac Formite	Bakelite Co. (Germany)
Resan Condensite	Condensite Co. (U. S. and Germany)
Plastose	Societe Vandier, Niort (France)
Duroid	Bakelite Co. (France)
Carbolithe	Societe Francaise, Lyon Plastiques (France)
Coralex	Societe Francaise, Vitry (France)
Isolid	Societe Francaise, Vitry (France)
Isolite	Societe Francaise, Lyon (France)
Isolithe	Beguin (Paris, France)
Redmanol	Bakelite Corporation
Micarta	Germany
Dorex Rudex	Societe Dorex, Paris (France)
Formica	U. S. and France

Casein Plastics

Cellulit Celluvert Caseilithe Sicalithe	Societe Industrielle du Celluloid (France)
Omnilithe	At Motende and Charente (France)
Axolith Luxolith Oyogallith	Societe Oyonnaxienne (France)
Isogallithe	Garrauad, Tailleburg (France)
Porcellanite Mergalith Algalith Pangene Corallith	de Charrard, at Ruel (France)
Galalith	Hoff, at Gennevilliers (France, Germany, etc.)
Carnoid Galliperle	
Casein Lurville Lactelithe	Cie. Generale d'Electricite (France)

(Note: From Revue Generale des Matieres Plastiques, 1925, 1, p. 6; through Kunststoffe, 1925, 15, No. 7, p. 116. The original article first appeared in Revue des Produits Chimiques, 1921, 24, 524 and 621 and gave considerable detail regarding the manufacture of the individual material enumerated.)

Selenite	English products. Now also in
Erinoid	U. S. A.
Cassoid	Maison Blanpain (Ezy, France)

Plastics made from Resins (as Copal, Gums, Tar, etc.)

Amiantine	Roux, Paris (France)
Ebonitine	
Redionite	Societe Francaise Gardy (France)
Ambroine	Grandgeneral, at Perreux
Omnite	(France)
Electrolite	Grivolas, Paris (France)
Romaite	
Stenobrithite	
Byantinite	
Eborin	Beguin, Paris (France)
Gummite	Cie. Generale d'Electricite
Cegeite	(France)
Roburite	
Isolithe	
Clemateite	Societe Suisse de Clematerite (Switzerland)

Isolantite and Prialithe are made from talc and leather scrap. Diverse other plastic products or heterogeneous origin are Ernelithe, Onyxite, Hemolithe, Stabilite, Electrum, Ambroin, Plastite, Viscoid, Fibre vulcanisee (vulcanized fiber), Pegamoid, Baleinite, Bitite, Bois durci (hardened wood), Hyalithe, Fibron, Ebenite, Faturane, Eswelite, Ezhalite, Tanacite, Agalithe, Festoine, Austrolite, Stabonite, Wenjacite, Wandrite, Zellith, Brauthite, Maisine and Algine. Duroprene is a celluloid substitute made from tetrachloro-isoprene and camphor in solid solution. Hyaline is made by Friederich Eckstein of Vienna by mixing equal parts of solutions of cellulose nitrate and rosin in a mixture of ether and alcohol.

Of merely historical interest are to be mentioned the Parkesine or Parkesite of Alexander Parkes, in England in 1865. Pegamoid or Loreid are also pyroxlin products, which, however, fall rather into the class of material now known as artificial leather. Viscoid is a viscose plastic product, and xylonite (the modern product) and Fibrolithoids are waxy, transparent materials which are mainly employed as constituents of lacquers.

(Note: This covers most of the European products, but does not by any means exhaust the subject of plastic names. Hundreds of such names have been trademarked or published and it is hoped at some later date to publish an alphabetic list of the same with an indication of their nature and manufacture. The Editors.)

Pyralin Windshields for Reckless Drivers

CRASH! a shower of broken glass and the inevitable cuts and bruises attending the daily smash-up of some taxicab—maybe even a serious injury, if not death!

A good part of the danger incident to such common occurences is avoided by a new sufficiently clear and stiff pyroxylin plastic sheeting so that the same may be used to replace the usual glass windshields and windows of motor cars and taxis.

The du Pont de Nemours Co., through their Viscoloid plant, have recently placed a heavy, clear pyroxylin (Pyralin) sheet on the market, all ready to install in place of glass.

This new heavy pyroxylin sheeting is quite different from the thin so-called "isinglass" of the ubiquitous side-curtains of the old open-car days, at least that is what the general public was want to call it. It is also distinct from the "nonshatterable" and "bullet-proof" triplex glass which consists of two sheets of plate glass cemented together by means of a sheet of pyroxylin or cellulose acetate plastic.

The Pyralin glass-substitute is solid pyroxylin plastic all the way through and in case of a crash simply buckles up and pulls out of the frame—leaving room for the driver or occupant to continue his forward progress uninterrupted—except perhaps by a telegraph pole or cement sidewalk!

All of which simply goes to show that as soon as an evil becomes too unbearable some genius evolves a remedy.

Cost Estimating on Toilet Ware

Suggested uniform methods submitted to the Toilet Ware Division of the Pyroxylin Fabricators' Association

By Leo Marder and Louis D. Cahn

THE need of a correct method and the desirability of a uniform plan for estimating costs is self-evident.

1. This outline will indicate one definite method which is supported by experience. It will not take up alternatives.

The main headings under which items of cost are grouped.

A Materials

B Labor

C Mfg. Overhead.

D Administrative and Selling Overhead

A Materials

1—Pyroxylin

Make a chart of the average weights of the different thicknesses of sheeting and tubing. Have the average broad enough and allow a little extra to take care of stock and running overgauge and composite work where binders are used.

Make a chart based on the weights determined previously to show the cost of sheeting at various prices.

Use an average size sheet for layouts. A layout on a pearloid on amber sheet may vary from that on some other color and the difference should be noted.

Where, in a layout, articles other than the one being figured are obtained their value must first be deducted. For example: figuring a mirror which lays out 10 to the sheet with 6 brushes

if the sheet costs	$28.01
deduct value of 6 brushes obtained from brush cost card	3.00
cost of 10 mirrors	$25.01
cost of 12 mirrors	30.01

No.	LESC.	SELL PRICE.....	DOZ.
	Finished Size		
.....	Totals	Totals	Totals GRS.
Material			
Celluloid			
Bristle			
Fittings			
Boxes			
TOTAL MATERIAL			
Labor (detailed on other side) plus 10%			
TOTAL LABOR COST			
MANUFACTURING OVERHEAD			
TOTAL			
3% Extra for defectives			
TOTAL MANUFACTURING COST			
ADMIN. & SELLING OVERHEAD			
TOTAL COST			

It is not advisable to allow from the cost of mirrors as figured above the value of manicure handles or buffer grips which might be obtained as the value of such small articles serves to offset other unexpected losses.

In figuring picture frames and like items allow from the material cost the value of any salve or cream jar tops or similar items obtainable from the insides. It is necessary to see that allowances for salve jar tops for example are not made from too many costs as an accumulation of such parts might result which could not be disposed of at regular prices.

2—Other Materials

Where bristle is bought in varied sizes at an average price each size must be revalued properly and so figured in pricing the bristle mixture.

Labor of mixing the bristle must be included in the per oz. cost of the bristle mixture.

Mirror glass, bottles, clock movements, etc., must be valued in the cost calculation at more than the price paid to take care of examining, breakage, etc. A definite percenetage of additional cost should be used. Many manufacturers use 10%.

Paper boxes should not be omitted as part of the material cost.

All materials purchased such as buffs, sandpaper, etc., which cannot be directly charged to a particular job should be included in factory overhead.

B Labor

Correct labor costs carefully determined must be used—costs based on the average worker under average conditions and with the average lots.

No item of labor which can be allocated to the job as direct labor should be omitted from the calculation.

It should be a rule to throw no item of labor into overhead, regardless of its nature which can be allocated to the job being figured.

Packing, intermediate ashing and polishing, etc., are direct labor charges and should not be omitted.

Due to material difficulties in this industry necessitating unlooked for operations like those due to warping or shrinking or shifting of stock, an arbitrary percentage should be added to the labor to cover such costs. Five to 10% of the total labor on the item in addition would not be too much.

C Manufacturing Overhead

This overhead should include all items of labor or material cost which cannot be directly applied to each particular job.

The principal items that go into Manufacturing Overhead are

Supplies
Shipping expenses
Factory rent
Insurance
  Fire
  Compensation
  Burglary
  Sprinkler leakage, etc.
Indirect labor
  Sweepers
  Foremen
  Machinists
Machinery depreciation
Trucking
Factory office
Light
Heat
Power
Repairs, etc.

The overhead figure should be based on the previous years experience and is determined as follows. The total value of all the items mentioned above and any others that might go to make up Manufacturing Overhead is divided by the total of the direct labor for the same period. The resulting percentage plus something for safety becomes the Manufacturing Overhead percentage to be used on all calculations.

This percentage times the direct labor on the calculation card gives the overhead value for that item. In other words the method of applying Manufacturing Overhead is on the direct labor basis. Direct labor as used above refers to those items of labor which can be directly apportioned to any particular job as ashing, polishing, sawing, etc. Indirect labor is labor which cannot be easily apportioned as foremen cost, sweeping, etc. Indirect labor goes into the Manufacturing Overhead.

On owned property depreciation of the property and taxes should be included in the Manufacturing Overhead.

Partners drawings and officers salaries should be included in the overhead figures.

To the total manufacturing cost should be added a percentage of about 3% to take care of defective or job merchandise.

D Administrative and Selling Overhead

This should be a separate overhead figure. It incluudes the following:

Officers salaries
General office expense
Accounting expense .
Financing expense
Taxes
Legal expense
Bad accounts
Commissions
All selling expenses

This overhead figure is arrived at as follows: The total of these items from the previous years statements is divided by the total manufacturing cost. The percentage arrived at plus something extra for safety is used until new figures can be obtained. This overhead figure is applied as a percentage of the total manufacturing cost. Total manufacturing cost means the total of materials, labor and manufacturing overhead.

Where the administrative work is handled at the factory or where it might prove difficult to separate the administrative costs this second overhead items might be limited to just the selling expenses. In other words all overhead expenses other than selling might be thrown into and figured as a part of the Manufacturing Overhead.

The principal items of cost have now been explained.

A compact cost calculation would be as follows:

Materials		$5.00
Labor (direct)	$3.00	
plus 10%	.30	
		3.30
Manufacturing Overhead 100% of Direct Labor		3.30
Manufacturing Cost		11.60
3% extra for defectives		.35
Total Mfg. Cost		11.95
Admin. and Selling Overhead, 3% of T M C		3.60
Total Cost		15.55
Add profit		
Selling price		

It is not intended that the percentages used above shall be adopted by any fabricator for his cost work. Each one must work out his own percentages. It is the uniform method of determining and applying the percentages which is recommended.

Control of costs, in materials and labor, and the reconciliation of such costs with the financial books have not been touched on.

A suggested form for cost calculation is reproduced.

Brush Mfrs. to Meet

The semi-annual meeting of the American Brush Mfrs. Assn. will be held at Briarcliffe Manor, New York, on Friday, October 2nd, 1925. The secretary of the organization, Mr. George A. Fernley advises that business of considerable importance will be discussed and hopes that there will be a good attendance.

See November PLASTICS for

'ERINOID'

A modern

Casein Plastic

By L. Lacey

Celluloid Company Moves

The executive and general offices of The Celluloid Company have been moved to their factory at 290 Ferry Street, Newark, N. J. This change will enable the Company to keep in closer touch with production.

The New York City salesroom has been moved to 58 W. 40th Street, where will be on display a full line of their "Arch Amerith Vanity Articles."

Ivory Nuts and Buttons

In vegetable ivory, nature provides a material for every man's buttons

Translated by A. C. Tate

THE Ivory nut palm, whose botanical name is Phytelephas, is indigenous to South America and grows mostly in a strip about ten degrees of latitude on each side of the Equator. The plant itself grows to the height of six or seven feet and the fruit thereof bears different names, usually determined by the point of origin or shipping point, such as for example Bahia, Manta, Cartagena, Esmeralda, Savanilla, Tumaco, Solon, etc.

Ivory nut is one of the few products that nature produces that can be utilized almost in its pristine form for the imitation of another valuable product, namely ivory. Its properties are such that it can be tooled into exact mechanical details, and as it is not only easily colored but can also be highly polished, it presents an ideal raw material, especially for the manufacture of buttons, which has become a very large industry.

Method of Gathering

The main difficulty is the relative small size of the nut, which entails considerable waste. The fruit itself grows in bunches of about 100 and the nuts weigh about 28 per kilo (2.2 pounds). The ivory nut trees form a jungle, and as the ground, especially during the rainy season is boggy, it is almost impossible to penetrate any distance

The nuts are gathered by the rather lazy natives, who, unless the price happens to be high, will not penetrate very far into the jungle as a long trip would not pay them.

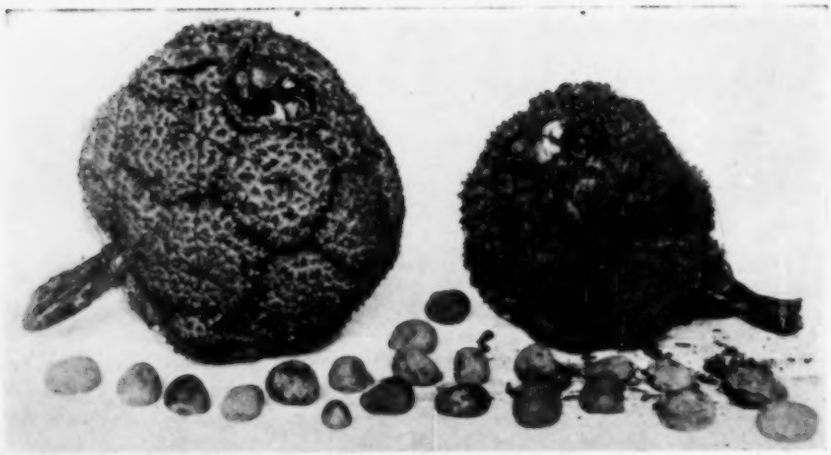
The size of the yearly crop is therefore somewhat regulated by the price obtainable.

After gathering, the nuts are separated from their brittle outer covering, first being dried to render the removal of this covering easier.

The treatment of the ivory nut presents many difficulties. If it is dried too rapidly, cracks will develop, as the nut when freshly picked is still somewhat soft and spongy in its interior. However, storage of from 6 to 8 weeks in the open air and in the tropical climate can very well ruin the entire stored supply of ivory nut, due to the at-

The Tagua or Ivory nut palm of South America. The nut clusters are plainly shown directly above the native. (Picture by Courtesy, Otto Gerdau Co., N. Y.)

From Butonia, 1925, Vol. 34, No. 6, p. 133.



Ivory nut clusters and the loose nuts. About 100 nuts are contained in each cluster. Each nut is about two inches in diam. (From Otto Gerdau Co., N. Y.)

tacks upon the same of a small butterfly, which has the unfortunate proclivity of laying its eggs in small holes which it punctures into the nut. As these eggs hatch the grubs start boring holes, which are about 1 millimeter in diameter and of course ruin the nuts. Fortunately, the butterfly loses its life while in transport so that there is no danger of attack during shipping.

Another difficulty sometimes encountered in commercial ivory nut is adhering sand, which plays havoc with the tools employed in cutting and shaping the nuts.

In order to prove acceptable to the trade, ivory nut must be of a definite degree of dryness, which is readily recognized by the color of the meat of the nut. If the nuts have been stored for many years, they will become yellow and horn-like and generally unuseable.

Polishing the Nuts

The manufacture of ivory nut buttons has been carried out since about the seventies by first tumbling the nuts to remove dirt and outer covering followed by cutting the nuts either into halves or certain special shapes depending upon the individual process developed by the different button plants.

Only about 20 to 25 percent of the nut actually finds its way into buttons, hence the cost is considerable due to this unavoidable waste.

After the initial shaping of the nut, which is done by automatic cutting knives, the button is provided with the indentation by rapid borers, followed by the boring of the four holes through the button. The crude buttons are then polished by being tumbled for about 48 hours; after which they are ready for dyeing. It is often the practice to use a certain amount of the trimmings and parings as polishing material in the drums.

Before being dyed, the ivory nut button is allowed to soak in water for 12 to 24 hours so that the pores will open and permit of application of the dyestuff, which is usually applied hot. The buttons are then dried and again polished by tumbling for two days in revolving drums.

Buttons which bear stamped markings are first allowed to pick up a certain amount of moisture by being stored in a damp place, following which they are stamped in presses. It is possible by suitable pressing to put metallic inserts into the ivory nut buttons and thus to decorate them with fancy designs.

All in all, the ivory nut button receives about twenty handlings before it is finished. The waste is sometimes ground up and used by bakeries as a dusting powder to prevent adhesion of the loaves of bread and cake to the baking tins. The ivory nut dust is also used as an excellent carbonizing material for hardening steel.

The Italian Celluloid Industry

From *Kunststoffe* 1925, **15**, p. 143.

PYROXYLIN plastics play an important part in the industry of Italy. The products manufactured consist of toilet ware, combs, hair-pins, toys, office and desk equipment, umbrella and cane handles and novelties, and the like. Statistics show a continually increasnig export of such articles from Italy, and foreign competition is slowly being driven from the Italian domestic market.

This is, however, somewhat offset by the necessity on the part of the Italian fabricator of importing all of his raw stock. The great increase in Italian importations of stock celluloid is shown by the table in the following column.

Year	*Hundred-weights*	*Value in Lire*
1913	4842	2,465,585
1920	7163	22,357,800
1923	5683	14,266,067
1924	8621	20,523,652

About 80 percent of the celluloid imported into Italy was used by the comb manufacturers, of which there are about thirty, employing upward of 2,000 workers. The other branches of the plastic industry of Italy play only a minor part.

The future of these industries is closely interwoven with the possibility of securing the required stock at reasonable prices. Recently local manufacture of pyroxylin plastic material has begun. One of the

(*Continued on page 29*)

Bakelite--What It Is

As an adjunct to commercial development, Bakelite is used in practically every industry

By Allan Brown

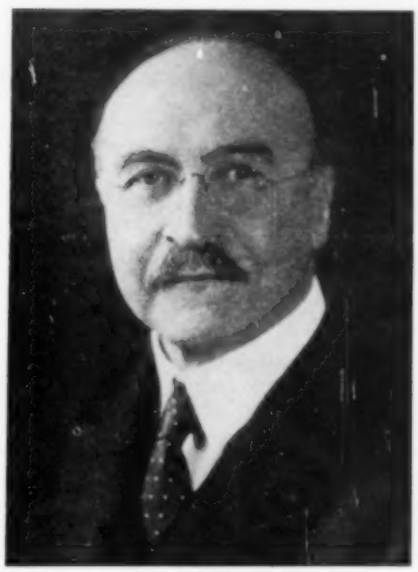
BAKELITE, commonly known as "The Material of A Thousand Uses," has become, in a relatively brief span of years, the leading medium in the field of plastic molding. Technically defined, it is a synthetic phenol-formaldehyde resin. In other words, Bakelite does not occur in nature as do such substances as wood, coal, amber, and shellac, etc., but is a resinous material which has been created in the chemist's laboratory, from the interaction of phenol (carbolic acid), and formaldehyde. That Bakelite is one of the outstanding chemical achievements, is evident from the fact that, for a wide range of uses, it is a better material than any which Nature unaided has provided.

The rise of Bakelite to its present commercial importance is one of the most interesting chapters in the history of American industrial progress. Less than two decades ago, it was unknown; today, it is rendering effective service in nearly every branch of industry. At the time of its invention, forty-three industries were enumerated in which there was a probability of its being used. The task today would be to find forty-three where it could not be of service.

An American Industry

The phenol resin industry is American both in its inception and development. It is based on the researches of Dr. L. H. Baekeland, who in 1909, announced to the scientific world, the results of his work, and has since then successfully exploited his invention in a commercial way.

The growth of the organization, now the Bakelite Corporation, has kept stride with the great expansion in the product's use. The product had its inception in a small private laboratory in Yonkers, N. Y. Today there are large factories located at Bloomfield, and Perth Amboy, New Jersey; Chicago, Illinois; Painesville, Ohio; and Toronto, Canada. The home office of the company is in New York City,



DR. LEO H. BAEKELAND

with a branch in Chicago.

Bakelite is manufactured in several forms to suit varying requirements. In all these forms the fundamental basis is the initial Bakelite resin. The variety includes Clear Material, for jewelry, smokers' articles, etc.; cement, used in sealing electric light bulbs in metal bases; varnishes, for impregnating electric coils, etc.; lacquers, for protecting the surface of hardware; enamels, for giving resistive coating to industrial equipment; Laminated Bakelite, used for silent gears and insulation; and molding material, from which are formed innumerable articles of utility and beauty.

The Molding Material is prepared ordinarily by the impregnation of cellulose substances with the initial "uncured" resin. Molded products are formed from the molding material by an application of heat and high pressure in hydraulic presses with hardened steel molds.

In the production of suitable molding materials, certain fibrous substances, notably wood flour, are intimately incorporated with the uncured resin. These, when properly employed, give a product having suitable flow in the mold when subjected to heat and pressure, with less shrinkage and greater toughness.

Compounding the Material

In practice the wood flour, sifted and dried, is mixed with the powdered, uncured resin and the two are ground together for hours. The resulting powder is then run between hot rolls, causing the wood flour to be thorousgly impregnated by the molten resin. The sheets of material coming from the rolls are ground to a fine powder which is then sifted, and thoroughly mixed to insure uniformity of the resultant molding material. In molding the many articles found on the market—such as radio parts and electrical insulation generally; distributor heads, shift lever balls, and other equipment such as knife handles, buttons, billiard balls, and thousands of articles too numerous to mention—each charge of the molding material is accurately weighed or measured before placing it in the mold, after which heat and pressure are applied. As the temperature rises, the resin

(Continued on page 28)

EDITORIAL · IMPRESSIONS

Preparedness Pays Dividends

THE prime requisite in any undertaing that hopes for success, lies in preparedness. An industry is healthy in proportion as the workers within it are skilled in the art, conversant with the latest developments therein and alert to the adoption of whatever appears to be endowed with lasting merit. Just to be content with things as they are is actual retrogression.

Competition that is based primarily upon considerations of price, and hopes to attain its ends by cutting prices to the utmost, and paring profits to the bone, is foredoomed to failure. On the other hand, honest competition, based upon quality, and doing the thing better than the other fellow, has the stimulating qualities of a fresh sea breeze that sweeps away the fog and mist of uncertainty and allows the Captain of Industry to pilot his Craft straight into the Harbor of Prosperity.

But there are times when even the clearest skies avail naught to the navigator unless he be provided with a reliable chart and the tools of navigation, and when his course, upon approaching the harbor is marked with light-house and buoy to keep him safely within the channel.

Our aim, in the conduct of Plastics is to provide the leaders and workers within the large field encompased by the generic term *Plastics* with a reliable guide to that which is new, valuable or interesting, so that, armed with the latest information, he may lay his course and voyage safely and serenely to his destination.

Articles on important phases of the Plastic Products art, written by recognized leaders in their respective field; reviews of progress made in other lands; up-to-date and reliable trade news and current prices will comprise the matter to be presented to our readers.

"Plastics"— A Definition

THE Century Dictionary gives the following deflnition of the *noun* PLASTIC:

"The commercial name of any of a class of substances, such as celluloid or viscose, which are worked into shape for use by molding or pressing when in a plastic condition."

This is such a complete and comprehensive definition that there remains little for us to add, except to the effect that we will endeavor to bring to the attention of the reader not only cellulose derivatives but also the synthetic resins in their largest sense, the natural resins such as shellac and copal, the casein and other albumenoid plastics, and the numerous perhaps more properly so-called "Composition Products" that are by nature of such a constituency that they may be formed or fabricated in heated or pressure molds. We will not include, however, such products as clay, cement, and the like which are sometimes termed plastic in the adjectival sense of the word. This will therefore encompass sound records, instrument dials, and much of the new radio art.

While we shall attempt to keep the material appearing in our pages as free as possible from technical language, the exigencies arising from the fact that so much that enters into Plastic products is of a chemical nature will no doubt necessitate considerable chemical terminology, and for this our lay readers, in the interest of our more technically trained friends, will pardon us.

PLASTICS

Our Responsibility

IN connection with the articles, both informative and technical, appearing in the pages of PLASTICS, the information therein contained and the opinions expressed are exclusively those of the contributors who so kindly give us their cooperation.

While every effort is made to keep the information as accurate as humanely is possible and to give unlimited opportunity for the discussion of questions and opinions, it is nevertheless obvious that through inadvertance and through belief based on good faith, that occasionally some contributor will give data or express opinions with which some of our other readers may be at variance.

—o—

The Demand

THE demand for Pyroxylin and other plastics is increasing and we see several items that are in particularly good demand right now.

Tubing for fountain pens has been good for the last month or two and it seems to be the desire of many fountain pen manufacturers to make more pens of Pyroxylin, Bakelite and Galalith than ever before. Eye shades and sport visors made from Pyroxylin are going strong right now. Water wavers are good and toilet ware, of course, has its usual seasonable demand around this time.

Pyroxylin and some of the other plastics are not in very great demand for buttons at present as the style trend in women's garments is away from this type of button, or are being shown without buttons at all.

Fashion has decreed fancy and beautiful fads in buckles for womens' shoes and this means that Pyroxylin and similar plastics are feeling a very strong demand from the manufacturers for this product.

Demonstrating at the Shopper's Expense

Shall the plastics industry countenance this method of selling to the consumer?

By Allan P. Ames

SPEAKING geometrically, the retail salesman is a triangle. His three sides touch, respectively, the manufacturers whose goods he sells, the retail distributor who hires him, and the consumers who face him across the counter. In a commercial Utopia he might well be equilateral, dividing his allegiance evenly among these three interests. The pressing realities of a hard world, however, have made him anything but symmetrical. Naturally, and as a matter of self-interest, he thinks of his employer first. But from the manufacturer's standpoint, how to make him maintain a fair and impartial attitude toward competing products is one of the most vexing questions of wholesale distribution.

Of late years the seriousness of this problem has been augmented by the spread of the system of demonstration characterized as "hidden," or "blind" or "secret." Under this system, for his services in "demonstrating" or pushing certain brands of merchandise, the salesman receives additional compensation which is arranged for in different ways, as bonuses, commissions, prizes, etc. His service is "hidden" not from his boss but from the customer, who has no reason to suspect that the persuasive person behind the counter who talks so convincingly of the merits of "Blank's Cold Cream" is being paid by the Blank company for the favor.

From Adevrtising & Selling Fortnightly, issue of August 26, 1925.

When the system first came into use it was the manufacturer who approached the retailer with the proposal that the latter permit the manufacturer to share the expense of the salesman's salary by means of such bonuses or commissions. From this it was an easy step to the point where the retailer refused to stock the manufacturer's goods unless the latter engaged some of the retailer's salesmen as demonstrators and paid part of their salaries. Now, in certain large department stores, many of these demonstators receive all their compensation from the interested manufacturer although ostensibly employees of the store where they work.

For 1925 We Have Resolved to Eliminate "Blind" Demonstrations

THE intensive merchandising activities of the last decade have developed what has come to be known as "Blind" Demonstrations. Such demonstrations are in charge of a salesperson, ostensibly an employee of the store, whose dual duty it is to supply—without an attempt at substitution—the article called for by the customer, and, at the same time, sell a certain amount of merchandise produced by the manufacturer who pays a part or all of h[illegible] salary.

W[illegible]

In a recent investigation of this subject covering a large number of department stores in many different States, the American Fair Trade League discovered an unexpected amount of confusion over terms and definitions. In the case of the demonstrator, his rightness or wongness rests upon the answer to just one question—Does he deceive the customer? So far as the "hidden" demonstator is concerned, there is only one correct answer. The customer is dceived because he or she supposes that the salesman's advice is unbiased and influenced only by a desire to give the best service.

The Fair Trade League's survey leaves no doubt that this fact is acknowledged by the great majority of department store merchants. Out of more than one hundred department store managers who wrote to the office of the League during the past month all but two declared that they oppose this class of demonstration and commended the stand which the League has taken against it. One of them, "The Emporium," the largest department store in San Francisco, is using space in the San Francisco papers to educate the public about the evils of the practice. One of these advertisements is reproduced on this page.

A great Chicago store, an institute which is known throughout the world, wrote that it is opposed to hidden demonstrators, and added, "This practice

(*Continued on page 34*)

Camphor Substitutes

Materials used for plasticizing cellulose esters in the manufacture of plastic materials

I. Pinene Hydrochloride

By Leo. S. Sacharoff, B. S., M. D.
and Frederick Klein, M. D., Ph. D.

Almost since the beginning of the Pyroxylin Plastics Industry attempts have been made to find a less expensive plasticizing agent for the cellulose esters. This is the beginning of a series of articles dealing with the better known and successfully applied plasticizing agents or "camphor substitutes."

PINENE-HYDROCHLORIDE (C_{10} H_{16} HCl) was first isolated as a pure salt by Kindt in 1803. Due to its marked resemblance to Camphor in appearance, structure and odor he justly named it "Artificial Camphor." (This is not to be confused with Synthetic Camphor.) This remarkable chemical resemblance has given impetus to much research abroad. The French scientists have made elaborate studies in this particular field for some years. It was not until the latter part of the nineteenth century, however, that any real definite research was performed along these lines. The German scientists, Wallach, Wagner, Bredt, Bayer and their followers performed extensive work on the terpenes and the terpene derivaties in combination with the halogens and the halogen acids about this time.

Pinene-Hydrochloride or better named Pinene-Monohydrochloride is derived from the combination of dry hydrochloric acid gas and pinene at very low temperature. It is a white crystaline salt, and as previously stated, has a camphor-like odor. It is neutral to litmus. It is lighter than water, having a specific gravity of 0.875. It is readily soluble in alcohol, ether, benzene, acetone and the other commercial solvents. It becomes gummy on compression. It melts at 125 degrees centigrade, and boils at 205 degrees centigrade.

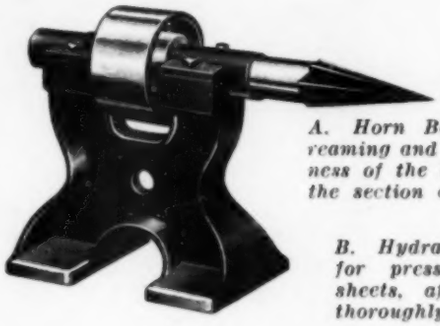
The German celluloid manufacturers have been using Pinene-Hydrochloride as a diluent with camphor for some time. In some instances they have used it as a pyroxylin solvent even without camphor with good results. This work has been limited however to the manufacture of hard celluloid. American manufacturers have not accomplished as much as their European competitors in this direction. This may be due to the scarcity of Pinene-Hydrochloride in the United States, or perhaps to the ever present "Free Chlorine Bugaboo." The constant fear of free chlorine has no doubt frightened the American celluloid manufacturer, that he looks with awe and disdain upon any substance possessing the "Cl" radical in its nomenclature. This impression is an erroneous one, and can be readily explained. It is a well know chemical fact that the presence of either free chlorine or a chloride will give a positive silver nitrate test and produce the well known white floculent precipitate of silver chloride. The performance of this test however, does not in any way differentiate between the presence of chlorine, the element, or the presence of a chloride, the compound.

By exposing to chlorine a piece of paper saturated with potassium iodide, free iodine is liberated and appears as a characteristic dark brown stain. If similarly prepared paper is exposed to the presence of a chloride, selecting one as potent as concentrated hydrochloric acid, free iodine is not liberated.

We agree with the celluloid manufacturer that the presence of the faintest trace of chlorine in a pyroxylin mixture will render the celluloid brittle and will tend to discolor it. This does

(*Continued on page 29*)

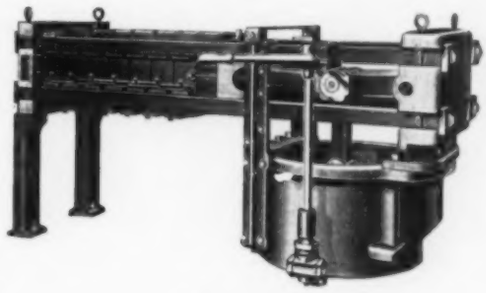
'Jimmy Goes into the Moulding Business'
By W. E. Rahm
Chief Eng., the Burroughs Co.
in November



A

A. Horn Boring Machine for reaming and reducing the thickness of the horn in the end of the section cut off next to the tip.

B. Hydraulic Clarifying Press for pressing horn into flat sheets, after they have been thoroughly soaked in hot water and hot oil.



B

Preparing Horn Stock for Combs

The first of a series of articles on the methods and machinery used in the making of combs

By L. B. Kavanagh

President, Standard Tool Co., Leominster, Mass.

IN preparing stock for making combs from horns of American cattle they should be sorted. Steer and ox horns are more valuable than cow horns.

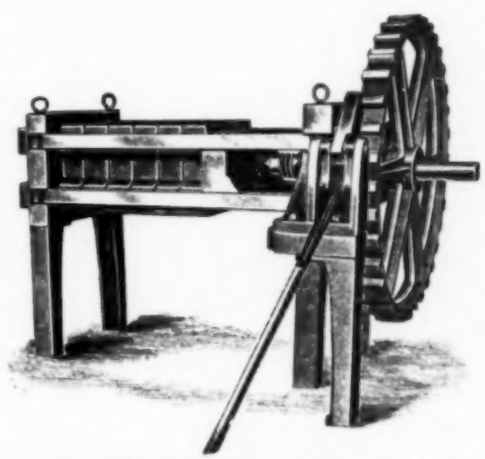
The horns are then sawed into cross sections with a circular saw, either one or two cross sections above the solid part of the tip, according to the length of the horn.

If the horn in the end of the section next to the tip is very thick, the hole may be bored out and the thickness of the horn at that end reduced with a horn boring machine which has a tapering cutter or reamer. It is then less liable to split when it it flattened out.

Horn tips are used for making Buttons, Handles, etc., but are not suitable for combs.

The sections of horn are then slit lengthwise with the saw on one side only and this should be the hollowing side, and when dresing coms are to be made it is desirable that this lengthwise cut should be made more or less diagonally or spirally through the section next to the tip. Dressing combs are made from Ox or Steer horns.. The plates obtained from Cow horns are not large enough for dressing combs.

The pieces are then washed and cleaned and the roughness on the outside removed by being tumbled in a tumbling barrel which should revolve slowly with its lower side in a shallow tank containing water. The tumbling barrel should have a removable door in one side, and the sides of the barrel perforated with holes, so that the water which may enter the barrel from a hollow shaft at one end, or from water in the tank, may circulate freely. A large molasses barrel can be made to serve as a tumbler and they have often been used for that purpose. The horns can be tumbled whole before sawing.



Horn Clarifying Press with 6 heater blocks tapped out on under side for connection with steam piping.

Before pressing, the sections of horn should be allowed to soak in a tub of cold water a few hours, or if very old and hard for a day or two. They are then put into a large kettle of hot water. The pieces are next taken from the hot water, not more than five or six pieces at a time, and put into a kettle of hot oil in which they should remain not more than four or five minutes. Melted beeves tallow makes the best oil for this purpose and it should be about as hot as possible and not burn the horn. As soon as a piece is taken out of the oil it is opened enough with the press tongs and poker to insert it between the boxes or platens of a horn press.

If a horn clarifying press is used, after pieces have been inserted in each space between the steam heated press boxes they are stretched and more or less

(Continued on page 27)

Two combs worn by Paris manikins at a recent fashion show at Deauville, France, indicate the probable return of the fancy comb. Those shown are no doubt made of casein or pyroxylin plastics.

Deauville Cries for Big, Showy Combs

"BIG comb, no hair, lots of ear" seems to be the cry at Deauville, France, where manaquins from Paris set the yearly style in head dress. The new coiffure gives unique displays of tortoise shell comb and futuristic angles of ivory and ivory substitutes.

If this style takes hold in this country, and what style coming from Paris has not proven popular, we will see great activity in the comb industry. Nothing could be finer for the fabricator and the manufacturer of pyroxylin and other plastics than the resumption of a style featuring bright and beautiful combs.

Another encouraging report in the daily papers of Sept. 21st shows the bobbed hair as fading from fashion. Extracts from the New York World follow:

Doom of Bob Due As Paris Models Let Locks Grow

Paris, Sept. 2—Dressmakers' models in Paris are letting their hair grow. Many persons take this as a sign the reign of bobbed hair really is to end, and the world of fashion is watching eagerly for a change in vogue.

Women have shown increasing restlessness lately on the subject of hair, and an increasing number of fair rebels has endeavored to throw off the yoke of the shingle. The revolt, first led by film actresses who complained long hair was necessary for their profession, has been joined by several leading dancers.

If the movement gets a firm footing in the establishments of Paris couturiers, then it is certain bobbed hair is doomed.

This is the kind of news that warms the corners of our hearts. The going of bobbed hair means the use of more and fancier combs. It means that there will be extreme styles and fashions in combs, for women will certainly want to adorn their hair with beautiful and intriguing articles.

Of course it will take some little time for the demand to get over here and also for a full growth of hair to be effected. But be ready, Mr. Manufacturer, for the call. Maybe Dame Fashion will be your ally after all.

Foreign Visitor

C. Muth, general superintendent of the plant of Nitsche & Gunther, Rathenow, Germany, was recently in this country looking over our modern factories. He also bought quite some equipment for his plant which manufactures optical frames and other pyroxylin goods.

The Ackermann Drug Co., of Lynn, Mass., has a new toilet goods buyer in the person of Mrs. E. Dumont, who has had considerable experience in this line.

Mr. Philip Thompson is the new buyer of toilet goods at C. F. Hovey Co., Boston, Mass.

New Toilet Goods Buyer

The toilet goods requirements of Pfeifer Bros., Little Rock, Ark., will hereafter be taken care of by Mr. Samuel Strauss. Mr. Strauss was formerly connected with a department store at Danville, Ill.

Manufacture of Celluloid

(*Continued from page 10*)

time one of the greatest, if not the greatest, problem in the celluloid plants was that of cleanliness. Through all the many operations there were any number of opportunities for dirt, dust, bits of metal, and wood, etc., to get into the material and every year hundreds of thousands of dollars worth of finished material was spoiled and had to be scrapped or sold for seconds on account of dirt or specks in the stock.

The process of filtering the material in its plastic state was also a German development and the first celluloid filtering press in this country was also of the Werner and Pfleiderer make and imported from Germany about the year 1911. However this machine although it performed the filtering operation very well, had very small capacity and was very slow and inconvenient to operate and its many complications were frequently getting out of order. Therefore, when another machine was required, the writer was given the task of designing it and the machine was built by John J. Cavagnaro. This press turned out very successfully and though it cost only about one-half the price of the German machine it had six times the capacity. It is now the standard press used by a number of the manufacturers in this country. This filtering operation practically does away with this bugbear of dirt and at the same time permits recovery of quantities of dirty scrap stock, floor sweeping, etc., that formerly was burned up as of no value.

(*Note: The conclusion of this article will appear in an early issue.*)

Miss Mabel J. Hirsch, formerly buyer for the Pelletier Co., of Sioux City, Ia., is now toilet ware buyer with Block & Kuhl, of Peoria, Ill.

TECHNICAL ABSTRACTS
AND PATENT REVIEW

PHENOL ALDEHYDE CONDENSATION PRODUCT; USE OF STANNOUS CHLORIDE AS A CATALYST. U. S. P. 1,549,888, Aug. 18, 1925. George Wellington Miles, Boston, Mass., assignor to American Cellulose & Chemical Manufacturing Co., New York, N. Y.

In place of the usual alkaline or acid condensation agents employed as catalysts in the production of phenol-aldehyde condensation products, stannous chloride is employed. The inventor states that this is rather surprising as stannic (tin) chloride does not give this reaction. The catalytic effect is so pronounced that cooling is necessary when starting the reaction. The condensation product obtained can be employed in conjunction with softeners, solvents, filling material, dyes, resins or rosin, and organic or inorganic derivatives of cellulose such as esters and ethers of cellulose. The reaction may be carried out in the presence of appropriate solvents or diluents. Claim: "Process of manufacture of condensation products between aldehydes and phenols in the presence of stannous chloride $SnCl_2$." (There is but one claim).

PRODUCTION OF IRIDISCENT EFFECTS ON BUTTONS, BUCKLES, ARTIFICIAL PEARLS and the like. Butonia, 1925, 34, 159.

Description of a patented process of Heusch by means of which iridiscent effects can readily be produced in the cold. The material to be colored is first coated with a gelatine layer, and after this is dry there is applied a mixture of 2 parts of alcohol and 1 part of water in which are suspended such materials as precipitated chalk, barytes, metallic bronze powders, wood fiber, zinc white, or similar pigment. If desired, a suitable aniline dye may also be employed.

After drying, the superficial deposit of inert material is rubbed off so that only the amount that has actually penetrated into the gelatine layer remains. Following this, the thus prepared articles are dipped into a bath prepared by pouring a solution of nitrocellulose in a mixture of 75 parts of 95% alcohol and 20 parts of ether into water. On withdrawing the articles from this water-nitrocellulose mixture, a very fine film will remain on the surface of the articles, which, after drying, will exhibit the well known and very beautiful interference colors characteristic of pearl and mother-of-pearl.

The same effect can also be produced by the use of benzine in place of the water above mentioned or by the use of a bath of 10 parts of potassium silicate in 90 parts of water. Otto W. Parkert has written a small book on the subject, (in German), called "Die Irisationstechnik," which describes a number of similar processes.

PLASTIC MADE FROM CELLULOSE ACETATE. Chemische Fabriken Weiler-ter-Meer and George Racky. German Pat. 391873, April 12, 1923.

In order to produce clear mixtures or solutions, diacydilated aromatic amines are employed as plasticiers for the cellulose acetate. Examples are diacetyl aniline, formylacetyl-o-toluidine and homologues thereof. These materials have the property of gelatinizing cellulose acetate even in the cold, and when solvents such as alcohol are subsequentlv added, will form clear, colorless solutions.

BOTTLE CAPS MADE FROM CELLULOID. Gustav Bonwit. English Patent 212270.

The bottle caps are formed from thin celluloid films which are treated with a solution of ammonium hydrosulfide, which renders them soft and pliable, by a sort of saponification process. A partial denitration undoubtedly takes place and the product is limp when wet with water.

The films produced are stored under water until needed. Their use is very similar to the already well-known Viscose bottle caps. The cap is applied over the cork and neck of the bottle and allowed to dry, when it will contract very strongly and finally produce a transparent and hermetically tight and attractive seal.

MANUFACTURE OF PLASTIC MATERIAL. Butonia Knopf und Chemische Produktenfabrik (A.-G.) German Patent 390206, 1922.

Colloids which ordinarily do not congeal are mixed which such colloids as have this desirable property, and the mixture is allowed to jell. The colloidal material preferred for this process consists of cellulose xanthogenate (viscose) and is mixed with a glue-like material produced by treating leather with alkaline solutions. The addition of emulsions, containing such resins as copal, mastic, or rosin, will modify the properties of the new plastic material.

"ARTIFICIAL" REAL AMBER. Butonia, 1925, 34, 185-6 (No. 8)

A description is given of the preparation of large pieces of genuine amber from genuine amber chips. This is said to be accomplished, (according to the Technische Rundschau), by first removing the outside brownish layer from small amber pieces or by using amber scrap, placing them in a strong steel cylinder under a pressure of about 50 atmospheres (750 lbs. per sq. in.)

While under this pressure, the amber fragments are heated to about 200 deg. Centigrade and the pressure subsequently increased to as high as 500 atmospheres (7,500 lbs. per sq. in.). Under these conditions, the amber unites and is extruded through suitable opening so as to form cylindrical or prismatic rods of from 2 to 4 centimeters in diameter (¾ to 1½ inches.)

According to the nature of the amber chips used, clear, smoky or mottled effects can be produced. In this case, the amber imitation is actually the genuine article, although not as valuable as large pieces of amber.

STIFFENER. U. S. P. 1,552,036 and 1,552,037, Sept. 1, 1925. Albert L. Clapp, assignor to Beckwith Manufacturing Co., Boston, Mass.

Thermoplastic materials such as various bitumens, resins, gums, waxes, asphalt and the like (examples:—rosin, copal, montan wax, calcium resinate, china-wood oil [tungoil]), are incorporated with cellulosic materials, fiber, hair, etc., and formed into sheets similar to felt paper. On heating the sheets thus formed the thermoplastic material will allow of shaping and molding the material.

FORMED VISCOSE. U. S. P. 1,550,360, Aug. 18, 1925. J. Huber and P. Eckert, assignors to Action Gesellschaft fur Anilin Fabrikation, Germany.

Formed masses of viscose are produced, such as artificial horsehair, artificial hemp, films, etc., by the addition to the alkali in which the cellulose xanthate is dissolved, of technical sodium silicate, in amounts up to 3 percent. Claim 1: "In the manufacture of formed viscose adding to the lye in which the xanthate is be dissolved an inorganic colloid capable of modifying the physical properties of the formed viscose. There are 3 claims in all.

Preparing Horn Stock for Combs

(*Concluded from page 23*)

clarified when the pressure is applied by means of the wheel and screw.

The wheel should be turned up with the hands as far as possible and then with the lever until the pieces have been reduced to the thickness desired.

Gauges of strip metal can be placed between the ends of the press boxes to govern the thickness to which the horn may be pressed. They should set for two or three minutes after being screwed up before they are released. This process tends to kill the life of the horn and make it more brittle.

If it is intended to make combs such as dressing and fine combs, with teeth as tough and strong as possible, a different type of press called a Raw Horn Press is generally used, in which the surfaces between which the stock is flattened are not heated.

The sections of horn when taken out of the hot oil are usually run through a Power Splitting Machine having rolls that carry the pieces on to the knife to even them up, and they are then inserted while still hot and pliable into the raw horn press.

Method of Splitting

The pieces are opened with the press tongs sufficiently so that a corner may be gripped between the rolls of the splitting machine, which should run very slowly to avoid cracking the horn. The pieces may be run through the splitter twice. The first time so that the side which formed the inner surface of the horn which has the coarsest grain, will be evened up by the knife, and then the opposite or outside surface of the horn.

This process is very much like that of splitting leather and machines for splitting leather, with but little alteration, have been used for splitting horn.

The flattened horn plates should not be taken out of a raw horn press before they are quite cool, and as not near as much pressure is required as for clarifying horn a number of small

raw horn bench presses, that have recesses in the boxes or platens to be filled with cold water to cool the plates more quickly, are frequently used. Only one piece is pressed at a time in one of these presses, and about 10 of them should be installed, so that if used in rotation, the plates may have sufficient time to cool off.

Horn plates for an ordinary grade of dressing combs or fine combs can be got out with a horn clarifying press if the horn is not heated or stretched to any great extent while in the press.

Horn Clarifying Presses are also used with an Hydraulic attachment in place of the wheel and screw, but they are more expensive and are only suited to locations where they can be connected with piping supplying water at a constant pressure of about 80 lbs. to the square inch, and it is not advisable to install them where repairs and duplicate parts are not easily obtained.

What Bakelite Is

(*Concluded from page 17*)

binder first softens, while the steadily increasing pressure forces the plastic mass into every crevice of the mold.

In the molding process the hydraulic pressure applied averages between 1500 and 2000 pounds per square inch; while the usual temperature employed is 180 deg. C. (356 deg. F.). The time of cure in the hot press varies according to the size and shape of the piece being molded. The molding operation transforms the resin into its permanent, strong, infusible, insoluble form, and then with little or no cooling, the molded object is ready to be removed from the mold to make way for a fresh charge.

Where greater resistance to heat is required, finely divided asbestos is employed in place of the wood flour, while low friction products, useful as dry bearings, are prepared with powdered graphite as the filling material.

In its finished form molded Bakelite is a heat resisting, highly dielectric, material, light in weight, mechanically strong, and impervious to oils, moisture or any of the common solvents. It lends itself readily to machining operations, and in its raw state can be molded with a high degree of accuracy and finish in an infinite variety of shapes.

Replacing Other Materials

Metal parts may be imbedded in the molded piece at the time of molding, thus saving much labor and expense over the method of assembling this work by hand, as was necessary before the advent of Bakelite. Electrical instrument makers are especially benefited in this

regard. Added to the economy of assembly is the saving of labor in finishing the molded product. A mold having a highly polished inner surface yields a molded object of highly lustrous finish as well as copying faithfully every minute detail of the mold.

Perhaps the best proof that Bakelite has been the solution to a wide variety of production problems is the fact that it has in innumerable places replaced metal, porcelain, wood, and other structural materials.

The story of Bakelite is interesting both from the nature of the product and the versatility of its use. The industry is yet young, and its phenomenal growth in the realm of plastic molding augurs much for its future development in this field. Bakelite really seems to have been created as if in answer to the call of a thousand uses which could be adequately suited by no other material.

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Camphor Substitutes

(*Continued from page 22*)

not occur in the presence of a chloride of Pinene-Hydrochloride. It is well known that hydrochloric acid, which is nothing more than a true chloride, is used in the dye industry to enhance brilliancy. This can be readily demonstrated in the laboratory by adding concentrated hydrochloric acid to a sensitive indicator such as methyl red (Dimethyl-Amido-Azobenzol-carbonic acid). The addition of the hydrochloric acid gives the red color greater brilliancy. The same is true upon the addition of Pinene-Hydrochloride to similar indicators. Should one however, add the slightest trace of free chlorine to methyl red, the dye will fade and rapidly bleach out entirely. Thus we see that this fear of chlorine does not apply to Pinene-Hydrochloride and therefore should not deter the manufacturer from using it.

The manufacturer should also remember that the molecular weight of Pinene-Hydrochloride is 173 as compared with 152 the molecular weight of camphor. This difference is an important factor in the cost of raw material, inasmuch as 90 pounds of Pinene-Hydrochloride will do the work of 100 pounds of camphor. Pinene-Hydrochloride has also been used in the recovery of celluloid scrap, and has been found to act faster than camphor in this branch of the industry.

The old adage "The Proof of the Pudding is in the Eating" still holds true, and in closing we shall quote the statement of an American Celluloid manufacturer who has been using Pinene-Hydrochloride in his process. This manufacturer has had more than fifteen years of experience in the celluloid industry and writes as follows: "The tubing after seasoning worked about the same as that made with camphor. The material hardened, and had none of the mushy characteristics that many of the camphor substitutes such as tricetin and acetanilid have. It does not crystalize out on the surface of the finished product, nor does it in any way effect the dyes used in making up the material. The finished tubing made from this material was shipped to one of our regular customers and fabricated into articles. He could not distinguish between this and the usual merchandise made from Japanese camphor that we have been furnishing him."

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Italian Celluloid Industry

(*Continued from page 16*)

pioneers in this connection is Pompeo Mazzucchelli, the founder of the Italian pyroxylin plastic industry, at whose instigation an Italian Celluloid Co. has been organized, known as the Sociata Italiana della Zelluloide. The factory is located at Gornate Superiore in the Province of Come.

Under present working conditions the output of this Italian celluloid plant is about 2,000 kilograms (4,400 lbs.) of material per day.

Pyroxylin Fabricators Discuss Eleven Important Topics

Report of the meeting held September 9, 1925

THE Toilet Ware Division of Pyroxylin Fabricators Association had a very interesting session on Wednesday evening, September 9th, 1925. The meeting, which was held at 200 5th Avenue, New York, was called to order at 7.40 p. m., by Mr. Morris Marx, of the Newark Tortoise Shell Novelty Co., who is the President of the recently formed association of fabricators of Pyroxylin Products. After a short introductory speech, he turned the meeting over to Mr. Leo Marder, the presiding officer of the Toilet Ware Division.

After the usual preliminaries, Mr. Marder instructed the Secretary of the Division, Mr. Frederick Nueske, to inform the members present of the subjects which would be discussed, by reading the report of the executive board of the Division. The subjects thus brought to the attention of the members of the Toilet Ware Division were:

Design Copying.

Jobs, Seconds, and Closeouts of Seconds.

Standardizing of Thickness of Material.

Eliminating the Consignment of Merchandise.

Uniform Cost Calculating.

Industry Propaganda.

Elimination of Hidden Demonstrators or Clerks.

Credit Information Interchange.

Freight Classifications.

Terms and Dating.

Conditions of Sales, Returns and Cancellations.

The first proposition under discussion was the question of Design Copying. The suggestion was made that an agreement be entered not to copy knowingly the designs of competing firms, and to provide that in case such copying should be alleged on the part of one member against another, that such matter be referred to a specially appointed committee, which would hold an inquiry and settle the dispute. New designs may be filed with the secretary of the Toilet Ware Division to assure priority to the originator.

Design Copying

Considerable discussion arose with reference to the copying of boxes or containers, it being very aptly pointed out that the manufacture of such boxes or containers was in many cases in the hands of the manufacturers of boxes and hence not under the control of the pyroxylin plastic fabricators themselves. An amendment to the resolution excepting boxes from the Design Copying provisions failed to pass, however, so that as the matter now stands, boxes are included in the voluntary agreement not to copy, knowingly, the designs originated by any member of the organization.

The question of proper Distribution of Seconds was discussed at considerable length, especially as applying to pyroxylin sheets. The manufacturers pointed out that there is an unavoidable production of seconds, which amounts to perhaps 15% of all the goods turned out, and that if the fabricators and consumers of the raw material would agree to accept a maximum of 15% of their purchases of any one grade or type of materials in seconds, the accumulation of such seconds by the manufacturers would be avoided.

The third proposition taken under advisement—the Thickness of Material Used in Producing Toilet Ware—dealt with the increasing tendency on the part of certain fabricators to substitute sheet stock of lesser dimensions, that is, thinner, than what has become standard practice among the better known manufacturers. A resolution was adopted which attempts to regulate the thickness of stock to be used in the fabrication of handmirrors having a diameter of 5½ inches and over, and 4½ x6½ if oval. The standard chosen is 300-1000 of an inch in thickness. It was also decided that for brushes having more than 11 rows of bristles that no sheeting less than 275-1000 be used.

Other Interesting Questions

The consignment of goods is to be suspended after Jan. 1, 1926. The queston of correct calculation of costs was considered such an important subject that an article on "Cost Estimates" was submitted to the members in the form of a mimeographed sheets.

As this is of considerable interest to every manufacturer, we present this paper to our readers in the present issue. (Page 13.)

The next questions which engaged the interest of the members concerned the propaganda carried on by various concerns and the general undesirability of having paid clerks to demonstrate the wares of a certain manufacturer.

The growing tendency on the part of window dressers in showing dressing tables without the usual display of toilet sets and means for bringing the latter to the attention of the buying public was also discussed.

It was decided to take under advisement the desirability on the part of the membership of joining the credit association for the interchange of credit information, and a committee to study this was appointed.

Classification of Shipments

The proper classification of shipments of toilet ware articles was next taken up, as it was deemed advisable to have all shipments uniformly and properly designated so as to secure uniform and equitable rates.

Terms and dating of invoices and the conditions surrounding sales and contracts were finally taken up and the meeting closed at an advanced hour. It is hoped to have another meeting in the near future and members will be duly advised as to where and when this is to be held.

The Treatment of Celluloid Fires

By George E. Ferguson
Chemist, Pyrene Mfg. Co.

in an early issue

The Future of Pyroxylin in the Toilet Ware Industry

Cellulose derivatives continue to play important part

By Morris Marx

Secretary, Newark Tortoise Shell Co.
President, Pyroxylin Fabricators' Association

PRIOR to the advent of pyroxylin plastics, as exemplified by celluloid, which first gained popular favor about fifty years ago, the toilet accessories, especially those appealing to the artistic sense of the weaker sex, were comparatively simple, with the exception of those that were made from precious metals. The silver and gold sets were, however, expensive, and the few genuine ivory articles were even more so. Then came Hyatt and Celluloid, which revolutionized the entire toilet ware industry.

Pyroxylin Is Indispensable

In the manufacture of toilet ware, such as combs, mirrors, brushes, manicure sets and the like, pyroxylin is well night indispensible as it possesses the one prime perequisite which enables mass production and adaptability, and without which the fabrication of the modern elaborately ornamented ware would be difficult if not impossible,—and that is its marvelous plasticity.

Pyroxylin has one property which the other similar materials offered as substitutes do not possess in nearly the same degree—its extreme plasticity when heated. This property enables it to be molded and shaped into the most complicated forms and allows a latitude of design that has proven an endless inspiration to the artistically inclined designer.

Originally by far the greater amount of pyroxylin plastic materials were made in imitation of ivory. By dint of continued improvements in the manufacturing methods, the imitation became more like the real article until the words "Ivory Toilet Set," at least in the minds of the purchaser, became synonymous with "Celluloid Toilet Set." Later as the other manufacturers entered the field, the individual trade names were advertised—but nevertheless the greater proportion of the pyroxylin sheets manufactured were the familiar ivory color

Variety Gives New Outlets

About ten years ago the demand on the part of the fabricators for a greater variety, and novelty effects gave rise to a number of important innovations. First came imitations of amber, both clear and cloudy, and many beautiful effects were obtained. This was followed by solid colors such as coral, turquoise, opal and the like.

Transparent effects in different colors, mostly in imitation of tortoise shell then had considerable vogue. The imitation became so perfect that only experts could differentiate between the real and the substitute.

A great stimulus was given the entire toilet ware art when shortly after the late war, Jos. H. Meyer brought out and popularized the now universally known "pearl" or "mother-of-pearl" effect. Within the short span of three years this type of material won for itself first place in the toilet ware trade and

many very beautiful sets were made up and sold. The latest developments consist in combining the transparent and translucent types of pyroxylin sheeting with solid colors and pearl effects, so that at present the possibility of new and striking effects is almost unlimited.

For example, there have lately been shown combinations of amber, pearl superimposed on black, on turquoise or opal and similar shade, with borders of amber, colored or clear pyroxylin. The development of the so-called "duotone" effect which preceded this contributed its share to the variety, so that the modern toilet ware accessories are a joy to the eye and touch.

Sure To Hold Its Own

There is no doubt whatever that pyroxylin will remain the predominating plastic material in the toilet ware and stationery accessories field. Its wonderful adaptability and variety assures that. The often discussed question of inflammability is destined to become of minor importance for it has been recognized that well made pyroxylin plastics are no more dangerous than countless other articles that adorn milady's budoir. Considerably less inflammable, especially in the thickness usually employed in making toilet and manicure sets (400-1000) than paper and fabrics, it can safely be used for every purpose of the dressing table. As an example of the relative inoccuousness of pyroxylin articles it may be mentioned that certain manufacturers have had returned to them for repairs

pyroxylin mirror backs and trays that had holes fused into them by contact with burning cigarettes or hot curling irons, although the rest of the article was unharmed. Surely if pyroxylin were as dangerous as generally assumed, serious conflagrations should have resulted from the obvious carelessness of the user.

While certain synthetic resins and casein plastics have recently invaded the field, there is little to fear from this source of competition. The resins lack elasticity and can be made only in a limited number of shades. In many cases the setting of mirrors is prevented by the high temperature required for molding such products. The casein products are not truly thermoplastic and hence are limited severely for the particular requirements of the toilet ware trade, while the other celluloid substitutes, such as cellusoe acetate or butyrate are not as yet sufficiently cheap and are also, as at present made, too brittle and uncertain.

Future Outlook For Pyroxylin

The constant desire for new and startling effects will doubtless keep interest keen and will be the cause of healthy competition between the fabricators. When once this competition rises above the plane of price-cutting and other attendant evils, and is based on originality and beauty of design, the entire industry will profit thereby.

Another feature that is of importance is the necessity of conducting this competition on the ethical basis of respect for the other fellow's ideas and the severe limitation of the plagiarism of design and color effects that now unfortunately is so prevalent. The question of firm prices the year round is also highly important as it is obvious that if the buyer is once tempted by a lower price to induce buying in the slack season, he will never consent to the increased prices when business is good.

BUYERS' GUIDE

ALADDINITE
Aladdinite Chemical Products Co.

ACCUMULATORS
The Burroughs Co.
The Dunning & Boschert Press Co. Inc.
A. B. Farquhar Co. Ltd.

ARTIFICIAL HORN
Aladdinite Chemical Products Co.
Erinoid Co.

BAKELITE
Bakelite Corporation

BLEACHED SHELLAC
Kasebier-Chatfield Shellac Co.

CAMPHOR (Synthetic)
Syncho Products Corp.

CASEIN PLASTICS
Aladdinite Chemical Products Co.
Karolith Corp.

CASEIN SOLIDS
Erinoid Co.

CELLULOID SCRAP
Johnson Products Co., Inc.

CUTTING DIES
T. J. Beaudry & Son

CUTTING MACHINE DEALERS
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Standard Tool Co.
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Evarts G. Loomis Co.

HYDRAULIC VALVES
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Bakelite Corporation

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Karolith Corp.

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Erinoid Co.
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PINENE-HYDROCHLORIDE
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PHENOL RESIN
Bakelite Corporation

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The Burroughs Co.
A. B. Farquhar Co. Ltd.
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The Dunning & Boschert Press Co. Inc.

PYROXYLIN PLASTICS
Nixon Nitration Works
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H. A. Browning

PYROXYLIN PRODUCTS
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Nixon Nitration Works
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Standard Tool Co.
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This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in PLASTICS. Please mention PLASTICS when writing to these firms.

Demonstrating to Shoppers

(*Continued from page 21*)

is entirely inconsistent with our desire to render the most helpful and efficient service possible to our patrons."

The two department stores which defended the practice put up an argument that the customer really benefited because the subsidized salesman or saleswoman was trained regarding the uses of the goods he or she demonstrated and therefore was able to give the customer better service. One of them wrote:

> "If you go to a perfume department and pay $2 or $3 or more an ounce for perfume, you would certainly rather buy it of one who had the ability to judge your personality enough to sell you perfume that would be pleasing to you rather than buy from a $10 a week salesgirl, and after enduring an unsatisfactory aroma for a few days throw it away."

This specious reasoning is typical of the few manufacturers and merchants who openly defend the system. The survey failed to reveal any such who thus far have publicly expressed their views. It did discover an unexpected interest on the part of the shopper, which, from the point of view of the League and others of like mind, is the most encouraging factor in the whole situation. Several women's organizations, including the New York City Federation of Women's Clubs, have adopted resolutions condemning "hidden" demonstration. A little more agitation by consumer groups and more informative publicity like that of the San Francisco "Emporium," would force the champions of this system to come out into the open and either defend and espouse the practice or condemn and repudiate it.

So far as the manufacturer is concerned, much as he wishes to gain a larger share of the salesman's attention, he has no desire to acquire favor with the man behind the counter at the expense of his influence with the consumer on the other side.

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